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REMARKS

In view of the following discussion, the Applicants submit that none of the claims now pending in the application is made obvious under the provisions of 35 U.S.C. § 103. Thus, the Applicants believe that all of these claims are now in allowable form.

I. REJECTION OF CLAIMS 1-2, 6-8, 10 AND 12-19 UNDER 35 U.S.C. § 103

The Examiner has rejected claims 1-2, 6-8, 10 and 12-19 under 35 U.S.C. §103(a) as being obvious over the Proctor application (United States Patent Application Publication No. 2003/0048770, published on March 13, 2003, hereinafter "Proctor") in view of the Redford application (United States Patent Application Publication No. 2003/0126298, published on July 3, 2003, hereinafter "Redford"). The Applicants respectfully traverse the rejection.

Proctor teaches a method for adapting a network access point to receive signals from wireless nodes in a peer-to-peer network. In particular, Proctor teaches that a fixed-location network access point through which network communications (e.g., between network nodes) flow can determine whether a received signal is being transmitted by a known node (i.e., a node that has previously transmitted a wireless signal to the access point) or an unknown node (i.e., a node that has not previously transmitted a wireless signal to the access point). If the signal is coming from a known node, the access point adjusts a receiving antenna to a recorded angle that is known to be a best receiving angle for signals from the known node. Alternatively, if the signal is coming from an unknown node, the antenna searches for an optimal angle at which to receive the signal, and this angle is recorded for future reference (e.g., making the previously unknown node now a known node). However, Proctor does not teach or suggest that the network architecture is ad-hoc or dynamically changeable such that the devices that are capable of adjusting their antenna angles are mobile. An ad-hoc network, as specifically defined in Applicants' specification at page 6, paragraph [00014], is a network that "... operates without a fixed infrastructure (such as a coordinating central hub) ...". Proctor's fixed-location network access point is such a

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coordinating central hub, and, as such, does not read on Applicants' ad-hoc network.

Redford teaches a kit for providing Internet and local area network access at temporary accommodations such as hotels and airports. In some embodiments, this kit includes software and network hardware such as a wireless or hard-wired network interface card for interfacing a user's computer to a fixed infrastructure local area network. In further embodiments, a site at which users can connect to the local area network also includes an access point connected to a two-way antenna. Thus, as with the network taught by Proctor, a coordinating central hub is required to interface a user computer to the network.

The Examiner's attention is directed to the fact that Proctor and Redford, singularly and in combination, fail to disclose or suggest the novel invention of adapting a receive antenna pattern of a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claims 1, 8 and 15. Specifically, Applicants' claims 1, 8 and 15 positively recite:

1. A method of adaptively controlling an antenna pattern of a mobile wireless communications device in a packet-switched wireless ad-hoc communications network, the method comprising the steps of:

receiving an electromagnetic signal over the packet-switched wireless ad-hoc communications network by a mobile wireless communication device having a receive antenna pattern;

determining if a source of the electromagnetic signal is an intended or unintended source; and

adapting the receive antenna pattern if the electromagnetic signal is from an unintended source. (Emphasis added)

8. An apparatus for adaptively controlling an antenna pattern of a mobile wireless network device in a packet-switched wireless ad-hoc communications network, the apparatus comprising:

first and second mobile antenna elements each receiving an electromagnetic signal from a source over the packet-switched wireless ad-hoc network and forming a receive antenna pattern;

a verification module, in communication with the antenna elements, receiving the signal from the antenna elements and verifying whether the source of the signal is an intended or unintended source; and

a controller in communication with at least one of the antenna elements and with the verification module to adaptively control the receive antenna pattern in response to

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a determination that the source of the electromagnetic signal is an unintended source.
(Emphasis added)

15. In a packet-switched wireless ad-hoc communications network, a method for use by a mobile wireless communication device having a plurality of antennas to control a direction of communication over the network, the method comprising the steps of:

cooperatively producing by the plurality of antennas of the mobile wireless communication device an antenna pattern for exchanging electromagnetic signals over the packet-switched wireless ad-hoc communications network; and

adapting the antenna pattern produced by the plurality of antennas in response to an electromagnetic signal received over the packet-switched wireless ad-hoc communications network to control a direction of subsequent communication over the network. (Emphasis added)

Applicants' invention is directed to a method and apparatus for controlling the antenna pattern of a network communications card to improve signal quality between mobile devices communicating in a wireless packet-switched mobile ad-hoc network. In a wireless packet-switched mobile ad-hoc network (e.g., a network that operates without a fixed infrastructure), communications between two mobile network nodes (e.g., computing devices coupled to the network) may be disrupted by interference from an interfering node or other device (e.g., a telephone) emitting signals on the frequency used by the network. It is therefore desirable to enable the mobile nodes to detect the interference and to adapt their receive antenna patterns accordingly, so that the effects of the interference can be minimized.

The present invention provides a method for adaptively controlling an antenna pattern of a mobile wireless communication device in a wireless ad-hoc network. Such capability has significant implications in ad-hoc networks, where user devices (e.g., mobile wireless communications devices) can move from place to place and will therefore be more likely than a fixed-location device (such as a network access point) to encounter signal environments where substantial interference is present. The mobile wireless communications device is adapted to detect whether a received signal is being transmitted from an intended (e.g., legitimate) or an unintended (e.g., interfering) source. If the source is an unintended source, the receiving mobile device adjusts its

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antenna receive pattern in order to mitigate the effects of the interference from the unintended source on the mobile device and on the ad-hoc network.

In contrast, Proctor teaches an access points that operates in a peer-to-peer network. In other words, the peer-to-peer network taught by Proctor has an at least partially fixed architecture (e.g., the access point acts as a bridge between wireless and wired nodes, such that at least the wired nodes and the access point at which signals are received are not mobile). As previously discussed in the Applicants' response of September 7, 2004, Proctor does not teach or suggest that the architecture of the peer-to-peer network is dynamically changeable (e.g., ad-hoc), or that the device receiving signals and modifying its antenna pattern is a mobile device. Redford does not bridge this gap in the teachings of Proctor. Specifically, Redford does not teach an ad-hoc communications network.

In contrast, the Applicants' invention positively claims the step of receiving an electromagnetic signal over a dynamically changeable, packet-switched wireless ad-hoc communications network by a mobile wireless communication device. The Applicants' invention thereby enables mobile communications devices in an ad-hoc communications network and within range of an unintended signal source to detect interference and to adapt their receive antenna patterns accordingly, thereby mitigating the effects of interference from the unintended source, e.g., without the assistance of a coordinating central hub or network access point. The systems of Proctor and Redford are completely devoid of any teaching or suggestion relating to the need to adapt the antenna patterns of mobile wireless devices in an ad-hoc wireless network.

In the January 13 Office Action, the Examiner seems to imply that an ad-hoc network, as taught by the Applicants' invention, is equivalent to a peer-to-peer network, as taught by Proctor or Redford (See, e.g., Page 2: "Proctor further teaches a peer-to-peer or ad-hoc network ..."). The Applicants respectfully disagree with this characterization. A typical ad-hoc network such as that claimed by the Applicants is a "spontaneous", self-organizing and self-healing (in view of network failures) network in which mobile nodes are responsible for discovery of each other and subsequent cooperation so that communication is possible. A peer-to-peer network is an application

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overlay network in which all entities are essentially equal and contribute resources, such that each entity or "peer" is both a content requestor and a content provider.

More particularly, although both ad-hoc networks and peer-to-peer networks share some similarities (e.g., substantially de-centralized architectures), they are also characterized by fundamental differences (e.g., relating to node or peer discovery, potential network size and relevance in Open Systems Interconnection models, among others). This assertion is supported by the fact that both Proctor and Redford rely on a coordinating hub or access point to act as a bit carrier or minimized "middleman" for communications between two devices. Typical ad-hoc networks eliminate the need for a network operator in the middle all together. Thus, a peer-to-peer network is not the same as or equivalent to an ad-hoc network. In fact, because the peer-to-peer networks of Proctor and Redford rely in part on an access point to facilitate communications, they actually teach away from the ad-hoc network claimed by the Applicants.

As the inventions taught by Proctor and Redford are drawn to peer-to-peer networks and make no mention of relevancy to ad-hoc networks, Proctor and Redford, singularly and in combination, clearly do not teach the adaptation of antenna patterns for mobile, wireless devices in ad-hoc networks. Moreover, because peer-to-peer networks and ad-hoc networks are not equivalent networks, it does not follow that the teachings of Proctor and Redford even suggest or motivate the adaptation of antenna patterns for wireless devices in ad-hoc networks.

Therefore, the Applicants submit that for at least the reasons set forth above, independent claims 1, 8 and 15, as they stand, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

Moreover, the Applicants respectfully submit that the Examiner's use of Redford as prior art against Applicants' invention is improper. Redford was filed on September 5, 2002. The present application was filed on December 20, 2001. Since the filing date of the present application precedes the filing date of Redford, Redford is not prior art to Applicants' invention.

The Applicants note that Redford claims priority to three provisional patent

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applications filed individually on September 5, 2001, November 30, 2001 and March 1, 2002 (hereinafter referred to as "Redford provisional application I", "Redford provisional application II" and "Redford provisional application III", respectively). Thus, only Redford provisional application I and Redford provisional application II contain disclosure that potentially pre-dates the Applicants' invention. Under 35 U.S.C. §102(e), the filing date of a provisional patent application may be the effective filing date of a United States patent claiming priority to such provisional patent application only to the extent that such provisional patent application supports the subject matter used to make the rejection. See MPEP §706.02(f). Thus, the Examiner must provide some evidence that Redford provisional application I and/or Redford provisional application II supports the subject matter of the published Redford application used in the rejection. Specifically the Applicants question whether Redford provisional application I and/or Redford provisional application II contains the subject matter used by the Examiner in the rejection.

Notably, there is no prohibition against the inclusion of subject matter in a non-provisional patent application that was not described in a prior provisional application to which the non-provisional application claims priority. That is, a non-provisional patent application may include new material not described in the provisional application. It is axiomatic that such new material does not receive the benefit of the provisional application. Applicants are not aware of any law or rule that states that all subject matter described in a non-provisional application is presumed to be described in a provisional application to which the non-provisional application claims priority. Thus, it is possible that the subject matter in the published Redford application relied on by the Examiner is not described in the Redford provisional applications that pre-date the Applicants' filing date (i.e., Redford provisional application I and Redford provisional application II). That is, the subject matter in the published Redford application relied on by the Examiner may constitute new material with respect to Redford provisional application I and Redford provisional application II. In such a case, the cited subject matter would not constitute prior art to Applicants' invention.

Therefore, in order to set forth a prima facie case, the Examiner must provide

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evidence that Redford provisional application I and/or Redford provisional application II supports the subject matter of the published Redford application used by the Examiner in the rejection. As such, without such evidence, the Applicants respectfully request the rejection to independent claims 1, 8 and 15 over Proctor in view of Redford be withdrawn.

Dependent claims 2, 6-7, 10, 12-14 and 16-19 depend from claims 1, 8 and 15 and recite additional features therefore. As such, and for at least the reasons set forth above, the Applicants submit that claims 2, 6-7, 10, 12-14 and 16-19 are not made obvious by the teachings of Proctor in view of Redford. Therefore, the Applicants submit that dependent claims 2, 6-7, 10, 12-14 and 16-19 also fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder.

II. REJECTION OF CLAIMS 3-5, 9 AND 11 UNDER 35 U.S.C. § 103

A. Claim 3

The Examiner rejected claim 3 under 35 U.S.C. §103(a) as being unpatentable over Proctor in view of Redford and further in view of the Locher patent (United States Patent No. 5,940,033, issued August 17, 1999, hereinafter Locher). The Applicants respectfully traverse the rejection.

Proctor and Redford have been discussed above.

Locher teaches an antenna patterning system that predicts the behavior of an adaptive antenna array in order to improve antenna performance. In particular, Locher teaches that a plurality of input files (describing, for example, network communications links, locations and signal powers of jammers, and base station antenna configurations) form an antenna description that may be adapted and applied to the base station receivers in order to minimize interference in a network served by the base station. By applying an adapted antenna description to the base station antenna configuration, a designer can better evaluate an optimal number of null signals to apply in a given scenario in order to counter sources of interference in the network.

In the Office Action of January 13, 2005, the Examiner acknowledges that Locher fails to disclose or suggest the novel invention of adapting a receive antenna pattern of

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a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claim 1, which has been recited above (*see*, January 13, 2005 Office Action, Page 3: "Examiner agrees with the Applicants' assertion ..."). Moreover, as discussed above, neither Proctor nor Redford teaches an ad-hoc communications network.

Therefore, for at least the reasons set forth above, the Applicants submit that independent claim 1 fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder. Dependent claim 3 depends from claim 1, and recites additional features therefore. As such, and for at least the reasons set forth above, the Applicants submit that claim 3 is not made obvious by the teachings of Proctor in view of Redford and further in view of Locher. Therefore, the Applicants submit that dependent claim 3 also fully satisfies the requirements of 35 U.S.C. §103 and is patentable thereunder.

B. Claims 4-5, 9 and 11

The Examiner rejected claims 4-5, 9 and 11 under 35 U.S.C. §103(a) as being unpatentable over Proctor in view Redford and further in view of the Youssefmir patent (United States Patent No. 6,141,567, issued October 31, 2000, hereinafter Youssefmir). The Applicants respectfully traverse the rejection.

Proctor and Redford have been discussed above.

Youssefmir teaches a method for adaptively processing received signals in a communications network base station including a smart antenna array. In a signal processing scenario, an existing receive processing scheme is based on a first set of signals for which characteristic information (*e.g.*, signal processing training information) is known. However, the existing processing scheme may be modified by incorporating information about a second set of signals for which training (or other characteristic information) is unknown. This enables the base station to adaptively update a receive processing strategy, based on the second set of data, to account for the presence of a changing interference environment (*e.g.*, by modifying receive weights assigned to signals received from each of a plurality of antenna elements).

In the Office Action of January 13, 2005, the Examiner acknowledges that

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Youssefmir fails to disclose or suggest the novel invention of adapting a receive antenna pattern of a mobile wireless communication device coupled to a wireless ad-hoc network, as claimed in Applicants' independent claims 1 and 8, which have been recited above (see, January 13, 2005 Office Action, Page 4: "Examiner agrees with the Applicants' assertion ..."). Moreover, as discussed above, neither Proctor nor Redford teaches an ad-hoc communications network.

Therefore, for at least the reasons set forth above, the Applicants submit that independent claims 1 and 8, as amended, fully satisfy the requirements of 35 U.S.C. §103 and are patentable thereunder. Dependent claims 4-5, 9 and 11 depend, either directly or indirectly, from claims 1 and 8, and recite additional features thereof. As such, and for at least the reasons set forth above, the Applicants submit that claims 4-5, 9 and 11 are also not made obvious by the teachings of Proctor in view Redford and further in view of Youssefmir. Therefore, the Applicants submit that all these dependent claims also fully satisfy the requirements of 35 U.S.C. § 103 and are patentable thereunder.

CONCLUSION

Thus, the Applicants submit that all of these claims now fully satisfy the requirements of 35 U.S.C. §103. Consequently, the Applicants believe that all these claims are presently in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issue are earnestly solicited.

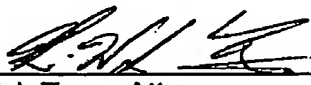
If, however, the Examiner believes that there are any unresolved issues requiring the issuance of a final action in any of the claims now pending in the application, it is requested that the Examiner telephone Mr. Kin-Wah Tong, Esq. at (732) 530-9404 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

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Respectfully submitted,

3/14/05
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